Pulsed Electro Magnetic Field Therapy

Research, Facts, Science, Studies, History and Testimonials

MAGNUS MAGNETICA, LLC.

www.MagnusMagnetica.com
PEMF [Pulsed Electro-Magnetic Field Therapy] therapy is already registered by the FDA to promote the healing of bone fractures and is in the process of being approved for many other uses, from migraines to depression, to sports injuries.

We’ve published this pamphlet to provide both the medical community and the public with additional information regarding the research, history, facts and basic science surrounding PEMF. For those seeking alternatives to traditional western medical remedies, we trust you will find the contents of this pamphlet informative, comprehensive and enlightening.

Magnus Magnetica is committed to continuous research, development and commercialization of drug free, non-invasive Pulsed Electro-Magnetic Field therapies for treatment of soft tissue indications, range of motion issues and neurological disorders.

We pledge to collaborate with medical, veterinarian, clinical and athletic communities, with the mission of improving care for the many patients and animals suffering from these disorders.

Our PEMF devices are currently used worldwide by athletes and non-athletes alike, treating injury and disease, with remarkable results. Flip this pamphlet over for more information on how PEMF technology is impacting the Equine and small animal world.

Kindly,

Henry Siegel
CEO/Founder

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An introduction to Pulsed Electro-Magnetic Field Therapy

Every single day people are discovering and enjoying new benefits of using PEMF (Pulsed Electro-Magnetic Field) therapy. As many people already know, the human body comes naturally equipped to repair itself. It is not the PEMF that heals the body in any way. It is the effect that the PEMF has on your body that is non-specific, because every cell in your body is positively affected by the magnetic resonance and is empowered to perform its many functions with greater speed and efficiency. If provided with the right intracellular conditions, physical materials, enzymes, and a strong connection to Earth frequencies, almost any ailment can be easily overcome.

Basic facts you’ll want to know:

- PEMF therapy is non-invasive, physical contact with the device is not even required.
- PEMF therapy regenerates damaged and diseased tissue, repairs torn tendons and fractured bones.
- PEMF therapy enhances the synthesis of protein within cells, allowing the body to take advantage of all the protein available.
- PEMF therapy improves circulation, not by increasing heartbeat or blood pressure, but by opening and dilating the arteries and capillaries. This also reduces swelling.
- PEMF therapy increases the cellular level of oxygen absorption. Studies have shown that oxygen partial pressure can be increased by 200%. This reduces pain associated with a lack of sufficient oxygen, in cells, which often causes lactic acid buildup under strenuous exercise.
- PEMF therapy is particularly effective in treating deep muscle soreness because of its penetration.
- Published, scientific studies on PEMF are in abundance. PEMF has been registered by the FDA and widely used in the treatment of human non-healing bone fractures for over three decades, and there is a growing body of literature concerning the biological and clinical effects of this technology. A recent study using pulsed magnetic fields reminds us that in clinical studies conducted over a 20 year period, millions of patients have been safely treated with PEMF.

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Long popular in Japan, magnet therapy has more recently entered public awareness in the United States. Golfers and tennis players extolling the virtues of magnets in the treatment of sports-related injuries have popularized this application to the point that sports apparel and accessory companies have caught on. Now we are quite familiar with constant energy magnet embedded pads which fit knees, shoulders, and ankle, as well as insoles and mattress pads, all of which are now widely available.

We learn from Chinese medicine, that magnet therapy goes as far back as 2000 years ago in China. In 16th century Europe, Paracelsus used magnets to treat a variety of ailments while two hundred years later, Mesmer also achieved renown for treating various disorders with magnets.

In the middle decades of the 20th century, scientists in various parts of the world began performing studies on the therapeutic use of magnets, especially in Japan, where from the 1940s on, magnets became increasingly popular. Yoshio Manaka, one of the influential Japanese acupuncturists of the twentieth century, used magnets in conjunction with acupuncture. Magnet therapy also became a commonly used technique of self-administered medicine in Japan. During the 1970s, both magnets and electro-magnetic machines were widely used among athletes in many countries for treating sports-related injuries.

In the United States, it was not until 1997 that properly designed clinical trials of magnets began to be reported. Results of several preliminary studies suggested that both static magnets and electro-magnetic therapy may indeed offer therapeutic benefits for several disorders. These findings have helped to intensify research interest in magnet therapy.

Types of Magnetic Therapy

Constant Energy Magnets
Long popular in Japan, magnet therapy has more recently entered public awareness in the United States. Golfers and tennis players extolling the virtues of magnets in the treatment of sports-related injuries have popularized this application to the point that sports apparel and accessory companies have caught on. Now we are quite familiar with constant energy magnet embedded pads which fit knees, shoulders, and ankle, as well as insoles and mattress pads, all of which are now widely available.

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Pulsed Electro-Magnetic Field (PEMF)

Pulsed Electro-Magnetic Field (PEMF) Therapy is non-static, unlike therapy with standard magnets, which are constant or static. To create a PEMF, an electrical current is introduced into a looped wire thereby creating a magnetic field. The electrical current is then activated and then deactivated in cycles between one time per second to thousands of times per second. The cycles and frequencies are dependant upon the unique design of any particular PEMF device.

In the main stream medical fields Pulsed Electro-Magnetic Field Therapy is utilized in the two following ways:

1. An specially engineered version of PEMF known as Repetitive Transcranial Magnetic Stimulation (rTMS).

rTMS is designed specifically to treat the brain with low-frequency magnetic pulses. This special form of Electro-Magnetic therapy is undergoing additional studies (See page 18 ) and many of these studies suggest that rTMS might be beneficial for depression. It is also being studied for the treatment of Parkinson’s disease, epilepsy, schizophrenia, and obsessive-compulsive disorder.

2. PEMF Therapy has been used to stimulate bone repair in non-union and other fractures since the 1970’s. This is the specific use that has been registered by the FDA. Although bone has a remarkable capacity to heal from injury, in some cases the broken ends do not join: these are called "non-union" fractures.

Studies using PEMF have shown great promise for other conditions such as: healing soft-tissue wounds by suppressing inflammatory responses at the cell membrane level, alleviating pain, and increasing range of motion. Interestingly, vision has been shown to improve in some instances through PEMF, an area that is still undergoing study.

At this time, PEMF is being investigated for its effect on osteoarthritis, stress, incontinence, migraines and a host of other conditions, discussed in this booklet.
A Brief History of Pulsed Electro-Magnetic Field Therapy

Five hundred years ago, Paracelsus, a Swiss physician and alchemist, wondered if diseases could be treated by magnetism. He used natural lodestones as these were the best magnets available in those days. Unfortunately, since natural lodestones are quite weak the results were inconsequential and no-one paid much attention to his ideas until the discovery of carbon steel magnets in the 1700's.

During the 1800's, early pioneers of our modern technical world such as Gauss, Weber, Faraday and Maxwell made many of the discoveries relating electricity to magnetism, one of the more interesting theories being that of the "Magnetic Field Deficiency Syndrome." This idea was picked up in our century by Dr. Kyochi Nakagawa of Japan who offers this phenomenon as an explanation of biomagnetics.

Over the last hundred years, the earth's magnetic field has weakened on average by about 6 percent and in the last thousand years it has fallen nearly 30 percent. Due to this decline in strength of our planet's magnetic field, Dr. Nakagawa suggests that there is a human health side-effect. He argues that a falling magnetic field puts us at risk since humans evolved in a magnetic field, thus it is necessary for proper health. and magnetic therapy can make up the deficit.

The areas of scientific and medical inquiry into the relationship between magnetism and human health is as complex and ripe for new discoveries as the anatomical functions and variety of components that make up the human being. To date, there appears to be no common consensus on the mechanisms by which magnetic fields affect human health but there is ample scientific evidence that the effects are powerful and diverse.

Some of the world’s most important and enduring scientific and medical breakthroughs took a long time to gain acceptance or be granted certain developmental permissions. Electro-Magnetic medicine is no exception to this rule.

For two hundred years, Electro-Magnets have been built from loops of wire powered by electricity; Nikolai Tesla being the first to introduce the powers of this technology. We all know of the “Tesla loop.” Through pulsing Electro-Magnetic energy, it is possible to produce rapidly changing magnetic fields. This opens a whole new world of medical applications for as has been discovered, by changing magnetic fields, we can induce tiny electrical currents in human tissue.

As far back as 1890, the American Electro-Therapeutic Association conducted annual conferences on the therapeutic use of electricity and electrical devices by physicians on ailing patients. All the years of persistence in this field are finally coming to fruition as Pulsing Electro-Magnetic therapy is now FDA approved for non-healing human bone fractures. Powerful electro-magnets are also often used in brain and muscle research to generate currents which can stimulate nerves to trigger sensations and flex muscles.

The interest in PEMF upon health is steadily building in medical sectors as attested to by the variety of research studies and clinical trials using Pulsed Electro-Magnetic Field Therapy. Literally thousands of such tests have been conducted internationally, including over 2,000 University level double-blind studies using PEMF for a wide array of ailments ranging from Arthritis to Vision.
The 15 Most Frequently Asked Questions about High-Powered PEMF

1. I feel like I am being treated with an Electro-Stimulator or “TENS” device. Why do my muscles contract? If you’ve ever used an Electro-Stim or “TENS” device, your first treatment on a high-powered pulsed electro-magnetic field (PEMF) device may feel very similar. An electro-stim device actually conducts electrical current through the selected area of the body. This electrical current is what causes your muscles to contract. However, because an electrical current seeks the fastest route to ground itself, this indicates that the electrical current may not adequately penetrate the specific area which requires the most amount of stimulation. A high-powered PEMF device radiates a very strong pulsed electro-magnetic field through the entire area which the magnetic loop is placed over. Thus, the nerves of the all muscle tissue lying deep beneath the magnetic loops are stimulated.

2. How are high-powered PEMF devices different than other PEMF devices on the market? Most PEMF devices are low powered and operate anywhere from 3-40 volts, creating a very low gauss output. A gauss is the measurement of magnetic strength. Treatments with such devices can span hundreds of hours. In most cases the user does not even feel a pulse due to a lack of penetration and gauss output. A high-powered PEMF device uses between 10,000 to 15,000 volts of low current electricity and produces a high gauss output. A higher gauss output reduces treatment cycles to a fraction of the time normally required with a low powered PEMF device. Most low powered devices remain an effective treatment method and should not be overlooked as an alternative to more costly, high-powered PEMF devices.

3. What is penetration depth and is it important? It is very important. Penetration depth is supposed to be a measurement of the distance that the magnetic field can effectively penetrate. Unfortunately, this number can be very misleading because most companies don’t know what is truly "effective". Some companies simply make up a number so that their product looks stronger than their competitors. This can quickly lead to very exaggerated claims as companies try to outdo each other. The best way to find exactly how far a given magnet will penetrate, some basic principles need be kept in mind:

ü Magnetic fields decrease rapidly with distance. The further the distance the weaker the magnetic field.

ü The earth’s magnetic field measures about ½ gauss (0.50 gauss). A basic law of physics and magnetism states that a stronger magnetic field will overpower and cancel out a weaker magnetic field. What this means is that any magnetic field that is ½ gauss (0.50 gauss) or less will be canceled out by the earth’s magnetic field and have no therapeutic effect. Technically, any magnetic field stronger than ½ gauss will have a therapeutic effect.

4. What determines the efficacy of a PEMF device? To be effective, a device must create a PEMF strong enough to completely penetrate the injured area at a therapeutic level. The problem is that the strength of a PEMF dissipates rapidly with increased distance from a PEMF loop.
Many times an injured area can be several inches below the skin. If a product is not properly designed, the PEMF will drop below therapeutic levels before reaching the site of injury, rendering the PEMF device less effective.

5. Other people being treated with similar injuries to mine, seemed to be less sensitive to the high-powered pulse than I was. Why was I more sensitive? Every person has a different level of sensitivity to a pulsing PEMF field. Some people are very sensitive on certain parts of their body, yet have no injury to that specific treated body part. Others have had severe injuries, yet are very receptive to higher intensity settings. Each person's own sensitivity and level of acceptable discomfort is what is most important when receiving high-powered PEMF Therapy.

6. Is more intensity better? Greater intensity (increased gauss levels) generally yields greater benefits. Deep blockages, scarring and trauma of connective tissue, ligaments, etc., may be present in the area being treated. The magnetic field radiates only so far, as the body's skin, muscles, sinew, fat, bone and muscle tissues hinder the penetration of the magnetic field. When using a high-powered PEMF device, maximum penetration can be achieved as the intensity setting and resulting gauss level is increased.

7. Should higher intensity settings ever be avoided? Absolutely! If the head or face are to be treated, a much lower intensity should be employed. A lower intensity should be used when treating fresh injuries or recently operated areas to avoid additional tearing or aggravation of any already traumatized tissue.

8. While receiving a treatment from a high-powered PEMF device, I noticed an irregular pulse pattern. Why? Some devices are designed to deliver pulses in a slightly irregular pattern. This prevents the body's ability to anticipate the next pulse, the resulting muscular contractions and the body's resistance to them. This causes the body to stop resisting these muscular contractions and allows relaxation.

9. With a relatively high increase in blood flow taking place in such a short amount of time, what physiological changes ensue during use of high-powered PEMF device? High-powered PEMF therapy accelerates vasodilation. In other words, the PEMF causes the body's venous system to dilate, instantly expanding the diameter of veins and capillaries. This action can cause one of two physiological events (see thermographs on Pages 8-9)

\[ \begin{align*}
&\text{ü More blood can flow to the area being treated, which is critical to accelerating the healing process.} \\
&\text{ü Around inflamed areas, vasodilation will help dissipate excessive build up of blood and body fluid, thus reducing swelling and inflammation.}
\end{align*} \\
\] 

Vaso-dilation quickly enables many other of the body's healing mechanisms. Additionally, the scarring and trauma to muscles, connective tissues, sinew and cartilage start to break up. This provides the relief most users experience after one or two treatments on an affected area.
Basic Digital Thermography to Evaluate Changes in Surface Body Temperatures

Case #1

Carpal Tunnel Syndrome being treated with high-powered PEMF

Images taken on December 9, 2008
at the American Association of Equine Practitioners,
Male Veterinarian 58 years old contracted Carpel Tunnel Syndrome
from administering 200-300 daily injections on race horses for 20 years.

No PEMF loop has been applied.
Start time 8:37:46 Temperature reading at edge of wrist 87.0 F degrees.
Yellow/Green indicates poor blood flow to forearm.

PEMF loop being applied.
Read time 8:39:27 - less than two minutes after initial image is recorded. Blood flow drastically increases across forearm. The camera is reading the loop temperature, which is 74.0 F degrees.

End of Treatment
Read time 8:46:04 - approximately 7 minutes after the second image is recorded.
Note: Significant increases in blood flow across forearm and top of wrist. More white indicates greater blood flow to hand.
Basic Digital Thermography to Evaluate Changes in Surface Body Temperatures

**Case #2**

Post Surgery knee being treated with high-powered PEMF

Images taken at the Yard - Athletic Training Facility
Images taken on February 5, 2009 in Hermosa Beach, Ca.
Female Basketball Player 18 years old
Had knee surgery in March 2008 for a torn ACL.

No PEMF loop has been applied.
Left Knee and surrounding area measured at approximately 85 degrees

- Note: The area of the left knee is “hot” (white), compared to the same area of the right leg due to recurring inflammation in mid-section of the leg.

PEMF loop being applied.
Time: 5 minutes

End of Treatment
Time: Ten minutes - The vaso-dilation caused by the treatment disperses the excessive blood pooling. This results in a reduction of inflammation and a reduction in surface body temperature throughout the entire mid-section of the left leg.

- Note: White markings are where the loops were wrapped on knee.
Physicians have long known that “the body electric” is for real: tiny electrical currents and magnetic fields are constantly firing off inside you. We just haven’t known how to harness these forces for healing. But a handful of scientists and medical innovators have relentlessly pursued this.

They’re succeeding, using something few docs know much about. It’s not a new pill or operation; it’s magnets. Not the kind you stick on the fridge, but pulsating electromagnets. They produce invisible energy waves that increase blood flow and normalise some electrical impulses to and in nerves.

One Food and Drug Administration-approved device (Yep, they’re that far), relieves more than 50% of post-operative pain. Nobody appreciates what a godsend that is like an anesthesiologist (Dr Mike) and a surgeon (Dr Oz). Well, nobody except every surgery patient who’s woken up to a world of hurt. Called the Torino, this PEMF post-op pain zapper is so new that even MDs who’ve vaguely heard of it probably think it’s a new car.

How do devices that use a pulsed electro-magnetic field (PEMF) relieve post-op pain and intractable back, neck, foot and arthritis pain?

Your nerves, cartilage, spinal fluid, bones, muscles and blood all rely on a symphony of dancing ions. PEMFs activate these electrically charged particles in ways that seem to turn off inflammation and turn on cell repair. PEMFs rev up production of nitric oxide, which increases blood flow to the targeted area. The combo stimulates an anti-inflammatory cascade that, in the Torino’s case, not only halves post-op pain, but also reduces swelling and speeds healing.

PEMF therapy also coaxes badly broken bones to mend that otherwise might not. When you break something, electrical “injury” currents rush through your bone, signaling instructions for knitting it back together. But in nasty breaks, that process short-circuits. To re-create the currents, surgeons implant electrodes into mangled bones. Not much fun, plus you look like Frankenstein.

Enter PEMF mats, bandages and knee braces, which stimulate healing currents. Aim PEMFs at the damaged zone for eight to 30 minutes, two to four times a day, and you’ll heal better, faster.

---Continued on Page II---
Side effects? Zero, at least in the short term. The products are still too new to know whether there are long-term issues. (Full disclosure! Dr Oz has no financial interest in any PEMF companies. Neither does Dr Mike, but he’s so excited about its medical potential that he may invest in one.)

So why hasn’t your doc even mentioned PEMF? Three reasons:

1. Docs are repelled by “medical magnet” charlatans selling bracelets, migraine goggles and shoe inserts which are as healing as sugar cubes.

2. Few physicians know a thing about how cells, nitric oxide and inflammation are affected by PEMF.

3. It takes so much time and money to prove medical devices are safe and effective that only two PEMF gizmos have earned FDA approval so far. Since neither is owned by a drug company with mega advertising bucks, your doc likely hasn’t heard a word about them.

What does a Low Powered PEMF treatment feel like? “Nothing,” says one person who has “tried everything” for back pain.”You don’t feel anything. Except immediately better.”

What if you or someone you love wants to try PEMF for pain that won’t quit? Consider only devices that use pulsed electromagnetic fields.

For the 20 percent of depressed patients who don’t respond to drugs such as Prozac, the traditional last ditch treatment option has been electroshock therapy. Recently, researchers worldwide began investigating a promising new alternative: transcranial magnetic stimulation.

In TMS, magnetic pulses created by a metal loop attached to the scalp generate small electrical currents in the brain. These stimulate nerve cells in areas involved in depression—without harming surrounding gray matter.

The treatment gained more momentum this spring when the Israeli firm Brainsway announced successful trials of its newest incarnation: deep TMS. “The magnetic fields of standard TMS devices extend only about half an inch into the brain’s cortex,” says Uzi Sofer, Brainsway’s CEO. “But the coils of deep TMS can stimulate neurons farther inside the brain by projecting magnetic fields into the skull from several points around its periphery.” This means that, for the first time, clinicians can target the brain’s deep seated limbic system, which plays an important role in mood regulation. So far, the device has lived up to its promise: 40 percent of the 64 depressed patients who received deep TMS achieved a clinically significant degree of recovery.

As Brainsway lobbies for FDA approval of the device, Sofer is also evaluating deep TMS’s suitability for Parkinson’s and other neurological conditions that affect brain areas far below the surface.

The YOU Docs, Mehmet Oz, host of The Dr Oz Show, and Mike Roizen of Cleveland Clinic, are authors of YOU: Losing Weight.
10. I feel very loose and relaxed after a 10-15 minute treatment. What causes that experience? Aside from the physical relief reviewed in FAQ #8 and FAQ #9, endorphins are released. Endorphins resemble opiates in their ability to produce analgesia and a sense of well-being.

11. Are there any contra-indications to be aware of when using a PEMF device? Yes, if you are pregnant, have any implanted electronic devices, such as a pacemaker, or are going into surgery within 36 hours of a PEMF treatment, you should not subject yourself to PEMF. People receiving PEMF treatment on recent surgeries should avoid higher levels of pulse intensity.

12. Is there any scientific research on high-powered PEMF devices? There is little scientific research because high-powered PEMF devices are a relatively new category of PEMF device. However, there are thousands of university level case studies for the use of PEMF on hundreds of indications, from arthritis to edema to neuropathy. A search online at www.PubMed.gov for, say, “PEMF and Arthritis” will yield medical abstracts indicating many case studies and treatments using low powered devices for hundreds of hours (see page 18). I.e. 8 hours a day, 5 days a week, for 6 weeks. Alternately, high-powered devices perform the same physiological function, but in a fraction of the time because of higher gauss levels and deeper penetration. As more high-powered PEMF devices are utilized in the medical community, expect more scientific research to appear.

13. Can a person be “over treated” with a high-powered PEMF device? Generally, the first treatment should be limited to no longer than about 6 minutes. After that, the answer is generally “no”. When treating a particular area for more than about 10-12 minutes, a high-powered PEMF is no longer delivering any benefits. As the body’s cells become more permeable, as a result of a PEMF treatment, toxins, which are locked away in the fat cells, are released. This is why it is very important to drink plenty of water in the hours which follow a treatment. Water helps to flush the system of these toxins. In some cases, a person receiving an extended first-time treatment may become nauseous, dizzy, etc., due to the volume of toxins being released into their system. Note: Lowered blood pressure, resulting from vaso-dilation, may also cause dizziness.

14. How often should a body part be treated to achieve long term results? Each person’s extent of pain or injury is unique. Therefore, there is no set treatment protocol for anyone or any one issue. Long-term chronic pain may require a dozen or more treatments, spread out over an extended time period. PEMF will almost always accelerate healing, however the rate of acceleration is generally related to the severity and extent of the injury. In many cases pain relief and/or increased range of motion is immediate, however these issues may return in 24 hours, in 2 days, or in 2 weeks. I.e. Pain relief from tendonitis may occur after one treatment, but returning to the activity which aggravated the condition in the first place, then more than likely, the condition or pain will quickly return.

15. How can a high-powered PEMF device be used in the treatment of, for instance, a dislocated joint or a herniated disc? Treating such injuries with a high-powered PEMF device can be very helpful for the reduction of pain, inflammation, swelling and can improve range of motion. However, a PEMF treatment does not address underlying bio-mechanical malfunctions due to musculoskeletal disorders. These types of injuries require the attention of an appropriate medical professional.
The effects of Pulsed Electro-Magnetic Field therapy are becoming increasingly apparent, particularly in professional high performance sports. Because of the exertion of daily endurance training, top-athletes are far more sensitive. Unlike the average person, however, they are aware of the smallest changes in their bodies.

Today, many world champions and Olympic medallists from a variety of sports rely on PEMF Therapy for medical and physiotherapeutic treatments. To legally optimize endurance, they count predominantly on the natural effects of PEMF therapy. However, PEMF therapy is not limited to these athletes as leisure and amateur sports people also benefit from its positive effects. The following observations and experiences in high performance and leisure sports have been reported:

- Improves regeneration and relaxation after training sessions or competition
- Ideal application for vitalization in the morning or as a passive warm-up prior to training or competition
- Helps prevent and treat muscle soreness
- Reduces lactate levels and increases glycogen levels
- Releases cramps and prophylactic bracing of muscles (adjusting muscular imbalance, for more effective stretching)
- Accelerated muscle and bone regeneration
- Higher levels of oxygen, nutrient supply and higher levels of blood circulation
- Boosts endurance due to increased oxygen absorption
- Strengthens immune system
- Encourages melatonin production and stabilizes the sleep rhythm (counteracts energy deficiency, jet-lag and burn-out syndrome)
- Supports and accelerates healing of sports injuries (strains, bruises, sprains, muscle and tendon tears, dislocations, nerve injuries)
Fascia and Repetitive Strain Syndrome

Fascia is a form of connective tissue. Its jobs are to provide a sliding and gliding environment for muscles, suspend organs in their proper places, transmit movement from muscle to the bones they are attached to, and provide a supportive and moveable wrapping for nerves and blood vessels as they pass through and between muscles. Fascia, in its non-stretchy form, is the substance that makes up tendons, which attach muscle to bone, and ligaments, which attach bone to bone.

Muscles are composed of muscle fibers that are each wrapped in a thin, tight sheath of connective tissue known as fascia. Bundles of muscle fibers are then over wrapped with a slightly thicker layer of fascia, then bundles of bundles are similarly wrapped with fascia and then the total muscle is wrapped again with another layer of fascia. As the muscle nears its end at a bone, the size and number of muscle fibers significantly decreases, narrowing the circumference of the muscle, but the fascia that has been wrapping those muscle fibers continues, becoming the tendon that attaches the muscle to bone.

Fascia is like a big cobweb that runs throughout your entire body.

The interconnected nature of fascia means that everything in the body is connected to everything else. When one part of fascia is injured or compromised in any way, it can affect tissues that are far from the original site of the injury or impairment. In the case of repetitive strain injuries, this means that tissue changes in the shoulder which are the result of an old injury can, over time, affect the condition and function of fascia farther down the arm and into the hand. This often leads to the confusing, seemingly unrelated symptoms that are often present in any case of RSI.

Symptoms may be felt in one area, but the source of the strain may be located somewhere else.

When poor posture habits cause fascial changes in the neighborhood around a nerve, then the normally loose, suspending fascia that protects that nerve becomes tighter. The nerve, inside its casing of tight fascia, can then become stuck to nearby muscle, bone, blood vessels, or even skin. Every time muscles in the area contract, the tight casing of fascia around the nerve gets tugged and the nerve becomes more and more irritated until an injury is felt, causing tingling, numbness, zinging sensations, and sometimes burning or weakness.

In the case of repetitive strain injuries that have muscle-based symptoms (weakness, pain, pressure, drawing sensations, congestion, etc.), the fascia surrounding and permeating through muscle becomes tight and restricted. This can prevent the muscle from accomplishing the work it is designed to do by inhibiting the full contraction and release of the tight muscle. This forces neighboring muscles to pick up the slack, helping the restricted muscle do its job. The problem is, the helper muscles aren’t designed to contract and release in exactly the same direction as the restricted muscle, so the
assistance causes more strain in the helper muscle. Thus, both muscle groups, primary and secondary, become restricted and strained and the process of creation of adhesion and more restriction continues.

Fascia creates a wrapping around the entire muscle, much like a sausage casing. This part of the fascia can also become adhered and will cause one muscle to stick to its neighbor. When one muscle contracts, it must drag along the muscle that is stuck to it, causing strain. Fascia tightens in the area to help protect the strained muscles, and more adhesions develop as a result.

Fascia molds itself over time according to how the body is used. Here’s a simple example of what that means:

Cross your arms over your chest and notice which arm ends up on top. Now, cross them the other way, with the other arm on top. Notice how funny this feels, how you are unused to crossing your arms in this way and how unnatural it feels to do so. This is because you have repeated your favorite way of crossing your arms thousands of times throughout your life and the fascia in your arms has been molded according to that pattern. The same thing occurs in any area of the body that is used in a repetitive way.

The moldability of fascia is the reason that ergonomics is so important when recovering from a repetitive strain injury. If a person habitually sits in a slouched posture, then over time the fascia in a person’s body will mold itself to that posture. Fascia in the chest will pull the ribcage down, fascia in the neck will pull the head and neck forward, the slouched position of the upper torso will change how the arm bones fit in the shoulder joints and the fascia in the shoulder area will change as a result. All of these posture-related tissue changes will be felt by the body as a source of strain. Now, add a repetitive motion using muscles in that area and you have the perfect environment for creating a repetitive strain injury.

What is Plantar Fasciitis?

The plantar fascia is a ligament band running from your heel to the ball of your foot.

This band pulls on the heel bone, raising the arch of your foot as it pushes off the ground. But if your foot moves incorrectly, the plantar fascia may become strained. The fascia may swell and its tiny fibers may begin to fray, causing plantar fasciitis.

Causes

Plantar fasciitis is often caused by poor foot mechanics. If your foot flattens too much, the fascia may overstretch and swell. If your foot flattens too little, the fascia may ache from being pulled too tight.

Symptoms

With plantar fasciitis, the bottom of your foot may hurt when you stand, especially first step in the morning. Pain usually occurs on the inside of the foot, near the spot where your heel and arch meet. Pain may lessen after a few steps, but it comes back after rest or with prolonged movement.

What is a Heel Spur?

A heel spur is a bony outgrowth at the base of the heel bone near the plantar fascia.

A spur may cause pain on the bottom of the heel when you stand. As with plantar fasciitis, the pain may decrease after standing or walking a short time. The pain you feel is not from the spur itself. Your heel hurts because the spur pinches a nerve or presses against the plantar bursa. With a bursitis (inflamed bursa) it may apply pressure to the plantar fascia.
Pioneers in the Field of PEMF

Nikola Tesla

In 1895, through the genius of Nikola Tesla, the Niagara Falls Power Company began sending alternating current (AC) to Buffalo, NY, twenty-five miles away. Cities throughout the world followed suit and made commercial AC power available to the general public, even miles from the power generating station. As a result, Tesla's high voltage loop devices, which were powered by AC, started to become widely known and applied.

In 1898, Tesla published a paper that he read at the eighth annual meeting of the American Electro-Therapeutic Association in Buffalo, NY. He states that one of the early observed and remarkable features of pulsed magnetism was its apparent harmlessness, which made it possible to pass relatively great amounts of electrical energy through the body of a person. Loops up to three feet in diameter were used for magnetically treating the body without contact, though ten to a hundred thousand volts were present "between the first and last turn". Tesla concludes that bodily "tissues are condensers" in the 1898 paper, which is the basic component (dielectric) for an equivalent circuit only recently developed for the human body. In fact, the relative permittivity for tissue at any frequency from ELF (10 Hz-100 Hz) through RF (10 kHz-100 MHz) exceeds most commercially available dielectrics on the market.

This unique property of the human body indicates an inherent adaptation and perhaps innate compatibility toward the presence of high voltage electric fields, probably due to the high transmembrane potential already present in cellular tissue. Tesla also indicates that the after-effect from his loop treatment was certainly beneficial.

Georges Lakhovsky

Georges Lakhovsky's philosophy was that "the amplitude of cell oscillations must reach a certain value, in order that the organism be strong enough to repulse the destructive vibrations from certain microbes." He goes on to say, "The remedy in my opinion, is not to kill the microbes in contact with the healthy cells but to reinforce the oscillations of the cell either directly by reinforcing the activity of the blood or in producing on the cells a direct action by means of the proper rays." To prove his point, Lakhovsky's Radio-Cellulo-Oscillator (RCO) produced low frequency ELF all the way through gigahertz radio waves with lots of "extremely short harmonics."

His book, "The Secret of Life" was first published in English in 1939. In 1949, a review of Lakhovsky's work was published as "Waves That Heal" by Mark Clement. Lakhovsky's theory is that each cell in the body of an organism—be it a plant, an animal, or a human—is in itself a little radio receiver and works on its own special little frequency. Each cell, in addition to being biological tissue, is also electricity. On that theory, he held that pathology was a not matter of biological concern or intervention, but one of electrical concern and intervention. The record of his treatment of degenerative disease, with what amounts to an early "energy-medicine" device, was remarkable and helped further the groundwork Tesla had begun 50 years earlier.

Antoine Priore

Antoine Priore's electro-magnetic therapy machine was perfected during the 1960's and early 70's while a team of
leading French scientists demonstrated conclusive, total remissions of terminal tumors and infectious diseases in hundreds of laboratory animals - all funded by the French Government. Complete remission of the treated diseases was attained, and the animals' immune systems were all restored to normal.

Antoine Priore began working in 1944-45 on the development of an electro-magnetic device which cured cancer. He received backing and help from some very interesting and courageous individuals including the world-famous immunologist Dr. Raymond Pautrizel of the University of Bordeaux, who did all the animal work. Dr. Pautrizel took the research in another direction using the machine to treat sleeping sickness in animals, which was his specialty. Sleeping sickness was of primary concern to Dr. Pautrizel because of its prevalence in tropical countries.

When he injected rabbits with the pathogen trypansome, which causes sleeping sickness, the rabbits would all die within 72 hours. But when exposed to the Priore device, these same rabbits would live. Yet their blood was still teeming with the trypanosomes which could be extracted from the radiated rabbits and injected into other control rabbits, which would then die. This implies that the machine was doing something electro-magnetically to the rabbits' immune systems such that they were able to fight off a lethal disease which would normally kill them in 72 hours!

Robert Becker

A pioneering medical doctor in the 1960’s, Dr. Becker is most famous for his book, The Body Electric, in which he gave an autobiographical account of his life experiences with bioelectro-magnetics.

Not only did he establish that the Chinese meridians of the body are skin pathways of decreased electrical resistance, but he discovered a host of other bioelectric effects within the body as well; for example the electrostimulating of limb-regeneration in mammals. He also worked on electrically stimulating bone growth with Dr. Andrew Bassett, who along with Dr. Arthur Pilla, developed a very effective PEMF generator to stimulate bone fracture healing, now approved by the FDA with an 80% success rate. Similar PEMF signals recently have been used effectively to prevent osteoporosis even in patients with an ovariectomy.

Abraham Liboff

A modern-day physicist and inventor, Dr. Abraham Liboff is the discoverer of electric-field and geomagnetic ion cyclotron resonance. This theory reliably explains the resonant interaction of static magnetic fields with endogenous AC electric fields in biological systems.

A physicist with Oakland University, he has helped introduce significant physics principles into the field of bioelectromagnetics. His "Method and Apparatus for the Treatment of Cancer" (US Patent #5,211,622) tunes an alternating magnetic field superimposed on a static magnetic field, to maintain a combined effect that has the proper cyclotron resonance frequency so that the neoplastic tissue containing a preselected ion can be treated to bring about a decrease in the proliferation rate of the cancer cells. It also can be combined with a chemotherapeutic agent for a synergistic effect. It is noted in the patent disclosure that "up to 100 days of treatment will provide beneficial results".
Samples from over 2000 Medical PEMF Studies

It is no surprise that the Medical and Research communities have embraced PEMF technology, performing thousands of university double blind studies on its application regarding a myriad of medical issues. The National Institute of Health (NIH) provides an online resource for hundreds of thousands of case studies for all types of medical treatments. Specifically, case studies for the application of PEMF technology utilized in treatments may be found at the NIH site called www.PubMed.gov.

At this site you may review research abstracts by simply typing into the search bar any medical indication and the word “PEMF” or “Pulsed Electromagnetic Field”. All the studies found on www.Pubmed.gov use low-powered PEMF devices. The following are some of the most researched indications often yielding positive outcomes.

- ARTHRITIS
- CARPAL TUNNEL SYNDROME
- CELL REGENERATION
- CIRCULATION
- DEPRESSION
- DIABETES
- EDEMA
- ENDOMETRITIS
- FIBROMYALGIA
- GLAUCOMA
- BONE HEALING
- SKIN WOUND HEALING
- HEMATOMA
- HYPERTENSION
- LYMPHOCYTES
- MIGRAINE
- MULTIPLE SCLEROSIS
- NERVE REPAIR
- NERVOUS SYSTEM
- NEUROPATHY
- OSTEOPOROSIS
- PAIN
- PARKINSON'S
- PELVIC PAIN
- RANGE OF MOTION
- TENDONITIS
- ULCERS
- VISION IMPAIRMENT
Purchasing a Pulsed Electromagnetic Field (PEMF) therapy unit for your home is a great investment in your health, and in the health of your family. Before you invest in a system, make sure you are getting the best possible unit for your needs.

www.pemfbuyersguide.com/

Purchasing a Pulsed Electromagnetic Field (PEMF) therapy unit for your home is a great investment in your health, and in the health of your family. Before you invest in a system, make sure you are getting the best possible unit for your needs.

www.Bioelectromagnetics.org

The Bioelectromagnetics Society promotes the exchange of ideas to advance the science of natural and applied electromagnetic fields in biology and medicine. This site also has a search engine where specific indications and relevant case studies may be researched.

www.DrPawluk.com

Board Certified in Family Practice in Canada and the United States, William Pawluk, M.D., M.Sc. is one of the world’s pre-eminent authorities on magnetic therapy. The reader will find both general and technical information about magnetic fields, their effects on biology, therapy principles and types of magnetic therapy systems and ideas, concepts on safety and risk reduction and a reading list for more in depth sources.

www.amritucson.com

Dean Bonlie D.D.S. is President of the North American Academy of Magnetic Therapy Association. He lectures and teaches courses at numerous alternative medical conferences throughout the USA.

Energy Medicine
The Scientific Basis
James L. Oschman, Ph.D.

Cellular Biologist and Physiologist James L. Oschman, PhD is a world authority on energy and complementary medicine. He has initiated a serious discussion of the energy therapies and their potential contribution to patient care. It is focused as much on the scientific basis of energy therapies and what these therapies tell science about how the human body works in health and disease.

Emerging Electromagnetic Medicine
M.E. O'Connor, R.H.C. Bentall, J.C. Monahan

The latest research findings in the field of electromagnetic radiation. The book discusses the use of electromagnetic fields in diagnostic and therapeutic medicine. It describes the theoretical concerns and actual mechanisms involved, current preclinical studies concerning the biological action of the electromagnetic radiation and reports on clinical application of electromagnetic therapy and current machinery used to do so.

Cross Currents, The Perils & Promise of Electromedicine
Robert Becker, MD

Dr. Becker tells of the emergence of electromagnetic medicine, which promises to unlock the secret of healing. He explains the effectiveness of alternative healing methods that use parts of the body's innate electrical healing systems.

The above experts and authors do not endorse any products mentioned or pictured in this publication, nor have they received any monetary remuneration or fees from the Magnus Magnetica, LLC.
PEMF testimonials worth watching!

YouTube now hosts a treasure trove of information about PEMF Technology. On these two pages we’ve illuminated a number of them worth watching.

Simply click on any image on these two pages or go to www.YouTube.com and type in the title to locate the respective testimonial.

Linden King, actor and former NFL Linebacker for the San Diego Chargers and Oakland Raiders back in the 80’s. Linden’s body, while relatively fit and strong for former NFL player, was riddled with chronic pain and range of motions issues. Watch his response after use two treatment sessions.

Wallace Croom, Gold’s Gym Fitness and Boxing Trainer, has a 3-5 year history of chronic pain from injuries to shoulder, knee, and toe. Each area was treated for no more than 10 minutes.

Dr. MJ Martinelli, DVM operates a referral practice specializing in the diagnosis and medical or surgical treatment of sports medicine issues of the equine athlete. Dr. Martinelli discusses his successes using the EquiPulse in his practice.
PEMF testimonials worth watching!

Dr. William Pawluk, highly regarded expert in the field of Magnetic Therapy demonstrates and reviews the Delta Pulse. The Delta Pulse is an innovative, high intensity, very low frequency pulsed electromagnetic field generator. The full spectrum of frequencies are useful in generating the physical responses of healing and physiologic adaptation expected for PEMF health benefits.

At a casting audition Mariano Mendoza, MMA Fighter, dislocated his left knee cap and tore the ligament on the back of the same leg. While awaiting a proper medical diagnosis, watch Mariano's progress over a 7 day period as he treated with nothing more than the Delta Pulse.

Tyrone Bennett, high caliber athlete and fitness trainer reveals his experience after being treated with High Powered PEMF. Tyrone also shares his thoughts on the use of PEMF technology for professional athletes.

Mike Antonelli, fitness enthusiast and health advocate discusses a surfing accident 10 years ago, followed by 2 car accidents, one where Mike's body was actually hit directly by the auto. This led him through years of ineffective physical therapy and prescription drugs. Hear his incredible experience after having been treated only 3 times with the Delta Pulse.
Pulsed Electro-Magnetic Field Therapy
Equine and Small Animals
Research • Facts
Science • Studies • History
and Testimonials
THE POWER TO HEAL®

SHORT HISTORY

PEMF therapy is another method of utilizing a magnetic field, somewhat like static magnets, which have been used for centuries. The Yellow Emperor’s Canon of Internal Medicine describes treating acupuncture points with lodestone, which emits a naturally occurring magnetic field, to relieve painful conditions. In the middle ages, magnets were very popular as they were thought to be a cure for almost any malady. Fast forward to the 20th century, when magnetic bracelets, beds, rings, belts, blankets, etc., have been sold to treat all manner of problems, from athlete’s foot to insomnia. Almost everyone has heard of using magnets therapeutically.

PEMF devices are a bit more complicated to use than just placing a magnet on the tissue. PEMF systems are composed of loops of copper wire, through which a current of electrical energy is delivered. The current is turned on and off a number of times per second, surging through the loop. The magnetic field expands around the loop, and then collapses, expands and collapses again with the pulse of current. One of the benefits of PEMF versus static magnets is that the fields are typically much larger, so you do not have to place the PEMF loop precisely on the area needing therapy. Given the correct amount of current and the optimum number of loop windings, some loops can emit a measurable magnetic field up to 18 inches from the surface of the loop. This makes it easy to use on equine patients, by strategically placing the loops in known problem areas like joints and major muscle groups.

In addition, PEMF patches and beds are now widely used in small animal rehabilitation centers to assist in therapy for degenerative conditions like arthritis and hip dysplasia. For horses, after short treatments over several days, owners and trainers can generally see and feel an improvement in the way the horse moves.

SCIENTIFIC STUDIES ON HIGH POWERED PEMF

There is little scientific research because high-powered PEMF devices are a relatively new category of PEMF device. However, there are thousands of university level case studies for the use of PEMF on hundreds of indications, from arthritis to edema to neuropathy on humans. These devices were developed under the theory that if a weak PEMF field has benefit, then a very large PEMF field must be much better. These systems make a characteristic noise when the field peaks, sounding like a crack or snap.

EQUINE APPLICATION

Over the last several years, we have seen the introduction of high-powered PEMF systems into race tracks, stables and barns. These beneficial effects are harnessed to treat equine tendon and ligament injury, sore backs, sore stifles, chronic hock soreness, sore shoulders, non-union fractures, laminitis, stone bruises, and non-healing wounds. Treatments typically last 30 minutes, and are not stressful; rather they are calming and relaxing.

When placed on a horse, the horse visibly and sensitively reacts to the large magnetic field charge. The operator of the system holds the loop over the body of the horse, and is subjected to this large field, too. Can humans be successfully treated with this same device? Yes, they can.

THE EFFICACY OF A HIGH POWERED PEMF DEVICE

To be effective, the device must create a PEMF strong enough to completely penetrate the injured area at a therapeutic level. The challenge is that the strength of a PEMF signal dissipates rapidly with increased distance from a PEMF loop. Many times an injured area can be several inches below the skin. If a product is not properly designed, the PEMF will drop below therapeutic levels before reaching the site of injury, rendering the PEMF device less effective. Greater intensity (increased gauss levels) generally yields greater benefits. Deep blockages, scarring and trauma of connective tissue, ligaments, etc., may be present in the area being treated. The magnetic field radiates only so far, as the body’s skin, muscles, sinew, fat, bone and muscle tissues hinder the penetration of the magnetic field. When using a high-powered PEMF device, maximum penetration can be achieved as the intensity setting and resulting gauss levels are increased.
Considerations when treating animals with High Powered PEMF

Introduction Process:
1. Introduce yourself to the animal - let it smell you and become accustomed to your presence.
2. Introduce the Loop - turn the device to a low intensity setting and let the animal smell the Loop.
3. Avoid any and all “surprises”.
4. For a new animal, maintain contact with one hand as you slowly bring the Loop toward the animal’s torso. The primary goal is to get the animal to relax.
5. At a fast pulse rate (low intensity) approach treatment areas slowly/carefully. Watch for signs of discomfort or alarm.

When High Powered PEMF is Working:
1. Discomfort eventually subsides.
2. Increase the intensity level for deeper penetration/treatment.

Contra-Indications:
Avoid using the High Powered PEMF concurrently with fly spray, toxic agents or liniment. PEMF increases cell permeability/absorption, potentially causing an adverse response.

But:
1. DMSO is OK because it already penetrates the cells and works well with High Powered PEMF.
2. Antibiotics are OK: PEMF aids antibiotic performance and aids cellular mobility.
3. If you are treating an area with an open wound or suture, consult a licensed Vet.
On Pets and Animals

Almost all the experimental research on the biologic effects of electromagnetic field therapies has been done on animals, especially on rats and mice. Work has been done on larger animals as well, including on guinea pigs, fish, dogs, cats, apes, horses, cattle, and birds. Most of this is basic biologic or physiologic research. Little has been clinical.

While there is little direct clinical research information, it is clear that all biology is affected by EMFs. Not all research results in animals may be applied to humans. Results may be species-specific and depend on the effects being measured. Basic cellular effects are often able to be translated to human experience. Many research models for specific diseases have been developed in specific animals because they are strongly related to human function. These include at a minimum, heart disease and arthritis in dogs, antioxidants in guinea pigs, cancers in mice, and so on. Therefore, not infrequently, treatments that work in humans will also work in animals. Drugs are usually tested in animals first and if they work there, are then tested and (if appropriate) used in humans.

Some of the first introductions of static magnets in the United States began with their use in horses. Later, pulsed magnetic fields were introduced as well for horses. At a conference put on by the North American Academy of Magnetic Therapy several years ago, a veterinarian presented her experience in using static magnets in horses. She was able to achieve dramatic results, often saving horses from surgery and/or being euthanized. Increasing numbers of veterinarians are using both static and pulsed magnetic fields in their practices. This is evidenced by an increasing supply from vendors of horse blankets, sleep pads for small pets, leg wraps, etc.

It is often the case that house pets, cats and dogs for the majority, tend to gravitate towards the magnetic fields used by their human owners. It is not uncommon for us to hear from patients that their dog/cat came to sit with them while they were doing a treatment with a PEMF device. We do not discourage this, and often hear from the patient that they have noticed an improvement in their pet. It is likely that because of their smaller body mass (as compared to most humans) that the household animal will require less time and less intensity than the human.

One of the amazing phenomena for animals is that their metabolic rates are so much higher than humans, and therefore they responded to PEMFs much more dramatically. As in humans, the challenge is when to apply the magnetic fields. Unfortunately, most people wait until it is too late.
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Dr. William Pawluk, MD, MSc. is a Board-Certified Family Physician, has training in Acupuncture, homeopathy, hypnosis and bodywork. Dr. Pawluk had academic appointments at a number of universities including John Hopkins and the University of Maryland. He is a national expert in the medical use of electromagnetics and energy medicine for more than 22 years.

Dr. Pawluk conducts research on the use of various kinds of electromagnetic systems on wound healing and other applications.

www.DrPawluk.com
High Powered PEMF in the Equine World

California Equine Orthopedics - San Marcos Ca.
Our practice focuses on diagnosing and treating musculoskeletal issues in performance horses. Therapy with a Pulsed Electro-Magnetic Field (PEMF) has revolutionized our ability to successfully return athletic horses to their full potential; in many cases obviating the need for joint injections or surgery. We have found the EquiPulse especially effective at treating acute or chronic sacroiliac injuries. We are also using PEMF Therapy for injuries or strains to the tissues around the joints, specifically at the insertion of the tendons, ligaments and joint capsule (entheses). In some of our clients’ training barns, the EquiPulse has been effective at helping the horses to “warm up” the large muscle groups prior to engaging in any athletic activity.

Mandy Porter - ACP Enterprises
“ACP Enterprises has used the EquiPulse for three years now and we couldn't be more enthusiastic about the machine and the results it produces. As with all athletes, some days require more effort in training and competing and with regular use of the EquiPulse, veterinary attention and restorative time have been significantly reduced. We're amazed at how we've even been able to reduce or eliminate joint injections on some of our horses. We've also had great success using the EquiPulse before schooling and competitions to help warm-up back muscles. Since using the EquiPulse, we have seen quieter and more relaxed horses overall.”

Barbara Ellison - Wild Turkey Farm
“We purchased our EquiPulse and have been fans ever since. We use it every day on all of our high performance horses before every workout, and at the shows will often use it twice a day. The horses relax totally while they being treated and thoroughly enjoy the treatment. I strongly believe it has made the difference in our Grand Prix stallion LaMarque. We would never think of going to a competition without taking the EquiPulse with us. I believe it has made a difference in the soundness of our horses especially those who have back or shoulder problems.”

Santa Anita, Ca. - Oliver Costello with Well Armed after winning the $500,000 Goodwood.
“The decision was made to utilize high powered PEMF because of a multitude of problems occurring with horses becoming sore in their hindquarters. I have also seen great results with other soft tissue injuries. Not only can the EquiPulse speed up recovery of a torn or injured tendon or suspensory ligament, EquiPulse therapy can also be used as preventative therapy. I find that treating 2-3 times a week, on a horse, to be the most effective.”